WHAT ADDITIONAL FLOWFIELD CHARACTERIZATION IS PRUDENT NEAR RED HILL TO SUPPORT RISK MANAGEMENT DECISIONS

THIS PRESENTATION WAS CREATED BY STEVEN LINDER

IT IS FOR DISCUSSION PURPOSED ONLY – DO NOT CITE OF QUOTE

THIS PRESENTATION DOES NOT REPRESENT A FINAL RECOMMENDATION FROM THE AGENCY

WHAT ARE THE KEY RISK MANAGEMENT DECISIONS THAT NEED TO BE MADE?

- WHAT INFRASTRUCTURE IMPROVEMENTS ARE NECESSARY AT RED HILL TO MITIGATE UNACCEPTABLE THREAT TO THE WATER SUPPLY?
  - TANK UPGRADES
  - RELEASE DETECTION UPGRADES
  - PIPING SYSTEM UPGRADES
  - OPERATION AND MAINTENANCE IMPROVEMENTS
  - CONTINGENCY INFRASTRUCTURE

WHAT ARE THE BAD THINGS THAT COULD HAPPEN AT RED HILL THAT MAY IMPACT WATER?

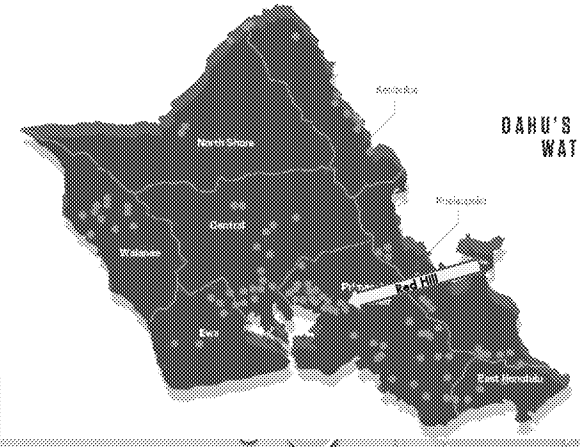
- PIPING AND LOWER NOZZLE FAILURE
- TANK VESSEL FAILURE
  - EMERGING RELEASE
  - CATASTROPHIC FAILURE
- MALFUNCTION / ERRORS
  - OVERFILL
  - ALARM SYSTEM FAILURE

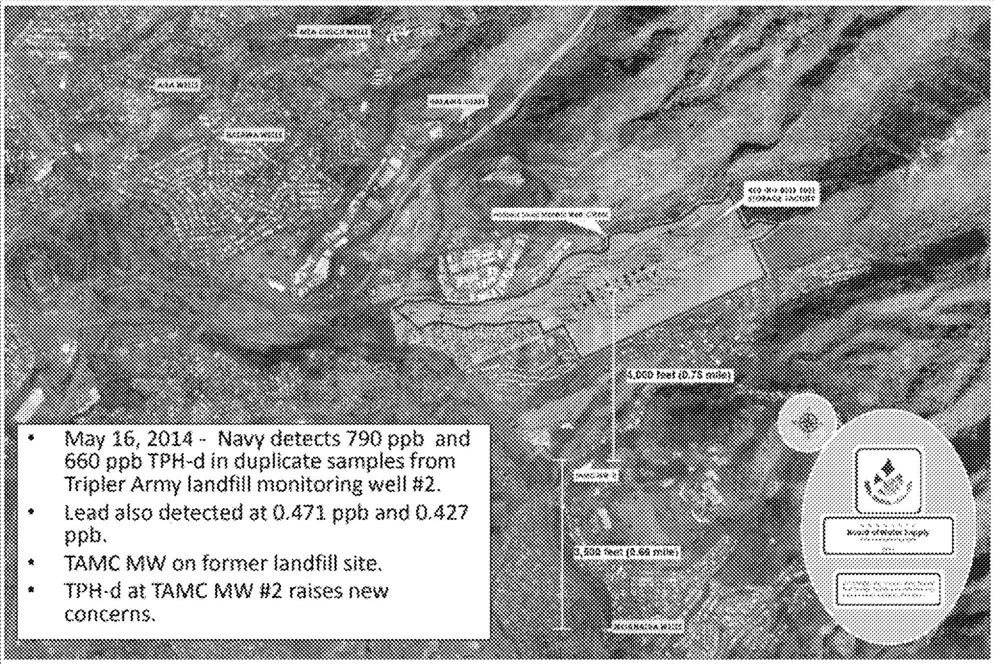
FAILURE PARAMETERS

- RELEASE MECHANISM
- MAGNITUDE
- DURATION
- SUBSTANCE RELEASE – JET VS. MARINE DIESEL
- EFFECTIVENESS OF EMERGENCY RESPONSE

RECEPTORS OF INTEREST

- RED HILL SHAFT
- HALAWA SHAFT
- OTHER





- May 16, 2014 - Navy detects 790 ppb and 660 ppb TPH-d in duplicate samples from Tripler Army landfill monitoring well #2.
- Lead also detected at 0.471 ppb and 0.427 ppb.
- TAMC MW on former landfill site.
- TPH-d at TAMC MW #2 raises new concerns.

MAGNITUDE AND PROBABILITY OF FAILURES

- STILL BEING STUDIED
- POTENTIAL / PROBABLY / POSSIBLE
- MAGNITUDE
  - RANGE FROM LEAK RATE BELOW DETECTION TO SUDDEN CATASTROPHIC LOSS OF MILLIONS OF GALLONS
- AT WHAT CHRONIC RATE WILL FUEL RELEASES IMPACT DRINKING WATER QUALITY?
- WHAT IS THE THRESHOLD OF AN ACUTE RELEASE THAT WILL IMPACT DRINKING WATER QUALITY

RISK TO RED HILL SHAFT

- CAPTURE ZONE
- TRAVEL TIME FROM POTENTIAL RELEASE POINTS
- PREDICTING IMPACT MAGNITUDE AND DURATION
  - VADOSE ZONE TRANSPORT
  - ATTENUATION
- RESPONSE TO IMPACT OPTIONS
  - SHUTDOWN
  - TREATMENT
  - CONTAMINATED WATER DISPOSAL
  - COMBINATION

RISK TO DISTAL RECEPTORS

- CAPTURE ZONES
- TRAVEL TIME FROM RELEASE POINTS
- EXPECTED NATURAL ATTENUATION
- POTENTIAL RISK MITIGATION ACTIONS IN RESPONSE TO RELEASE
  - MONITORING
  - ADJUSTMENT OF PUMPING RATES
  - TREATMENT CONTINGENCY MEASURES

IDENTIFICATION OF DATA GAPS RELATED TO AQUIFER FLOW CONDITIONS THAT, IF FILLED, WOULD SIGNIFICANTLY INFLUENCE RISK MANAGEMENT DECISIONS

- WHAT IS THE DATA GAP?
- WHY IS IT CRITICAL?
- HOW WILL ADDRESSING IT INFLUENCE RISK MANAGEMENT DECISIONS?
- WHAT DATA AND/OR ANALYSIS IS NEEDED TO ADDRESS DATA GAP?
- WHAT IS THE LIKELIHOOD THAT THE DATA GAP CAN BE SIGNIFICANTLY REDUCED OR ELIMINATED?
- WHAT IS THE COST AND LIKELY SCHEDULE TO ADDRESS THE DATA GAP?

IN CONCLUSION

- WHAT WORK SHOULD BE DONE?
- WHY?
- WHEN / HOW LONG WILL IT TAKE?
- HOW RESULTS INFLUENCE FUTURE WORK?